CHAPTER 11: MASTER REMOVAL SECTION

Contents

THEORY OF OPERATION

1. Master Presence on Drum Check System 11T-1
2. Clamp Plate Opening System 11T-2
3. Master Removal System 11T-4
4. Disposed Master Check System 11T-6

REMOVAL & ASSEMBLY

1. Master Removal Unit 11R-1
2. Master Removal Solenoid, Master Removal Hook & Vertical Transport Roller (Down) 11R-3
3. Master Removal Sensor, Master Loading Sensor, Master Removal Hook Sensor & Disposal Box Master Sensor 11R-4
4. Disposal Box Master Sensor (Send) 11R-5
5. Master Removal Fan 11R-6

ADJUSTMENT

1. Projected Position of Master Removal Hooks 11A-1
2. Position of Master Removal Hook Sensor 11A-2

LED DRMC Position C Sensor
– Light up when light path is blocked
CSEN Master loading sensor
– Light up when reflected light detected
Test Mode No.11 Position C sensor
– Short interval beeps when light path is blocked
No.48 Master loading sensor
– Short interval beeps when reflected light detected

THEORY OF OPERATION

1. Master Presence on Drum Check System

- Check of Master Presense on Drum

When the START button is pressed for master making, the Master loading sensor checks the presence of the master on the Drum at the Position C-1.
If the machine already knows the presence of the master on the Drum from the earlier machine operation, this master check movement is skipped.

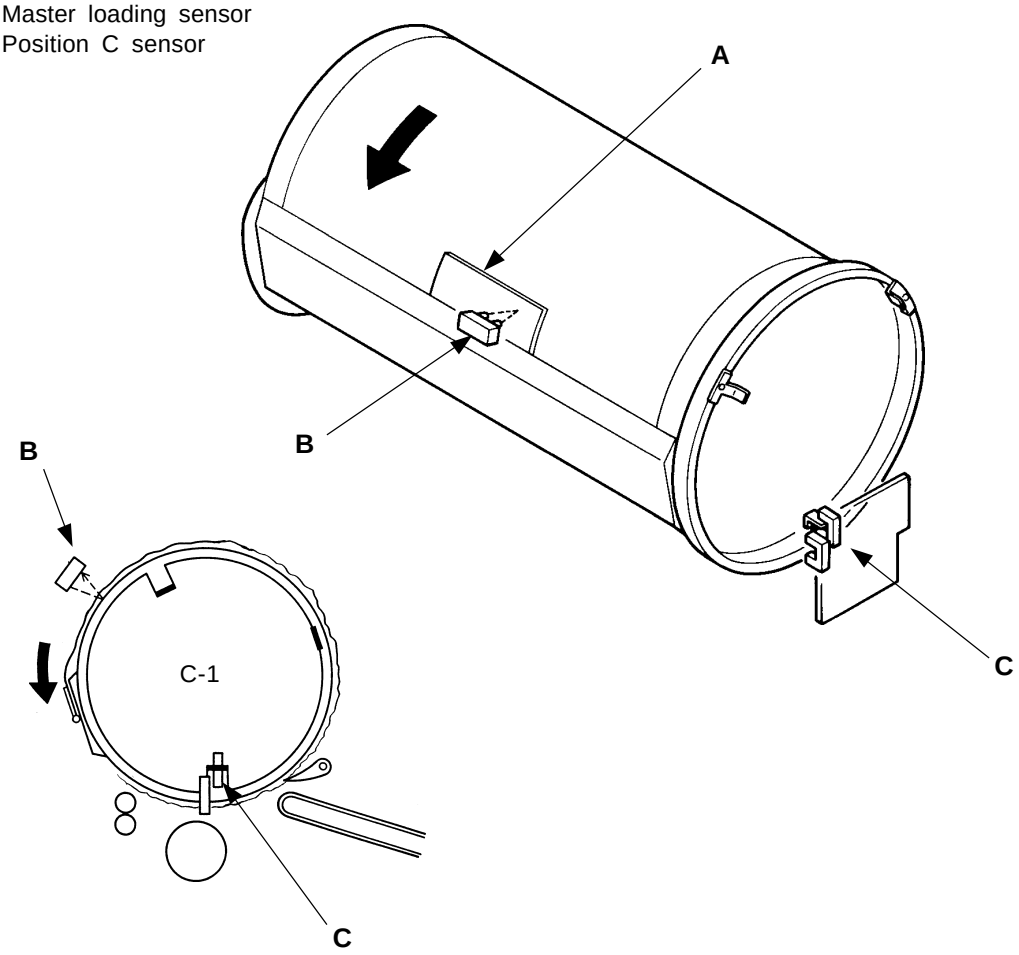
When master is detected on the Drum

The machine goes into master removal and Master removal sensor becomes active.

When master is not detected on the Drum

The machine goes into master removal but Master removal sensor does not check if the light path is blocked by the removed master.

A: Light absorber strip
B: Master loading sensor
C: Position C sensor

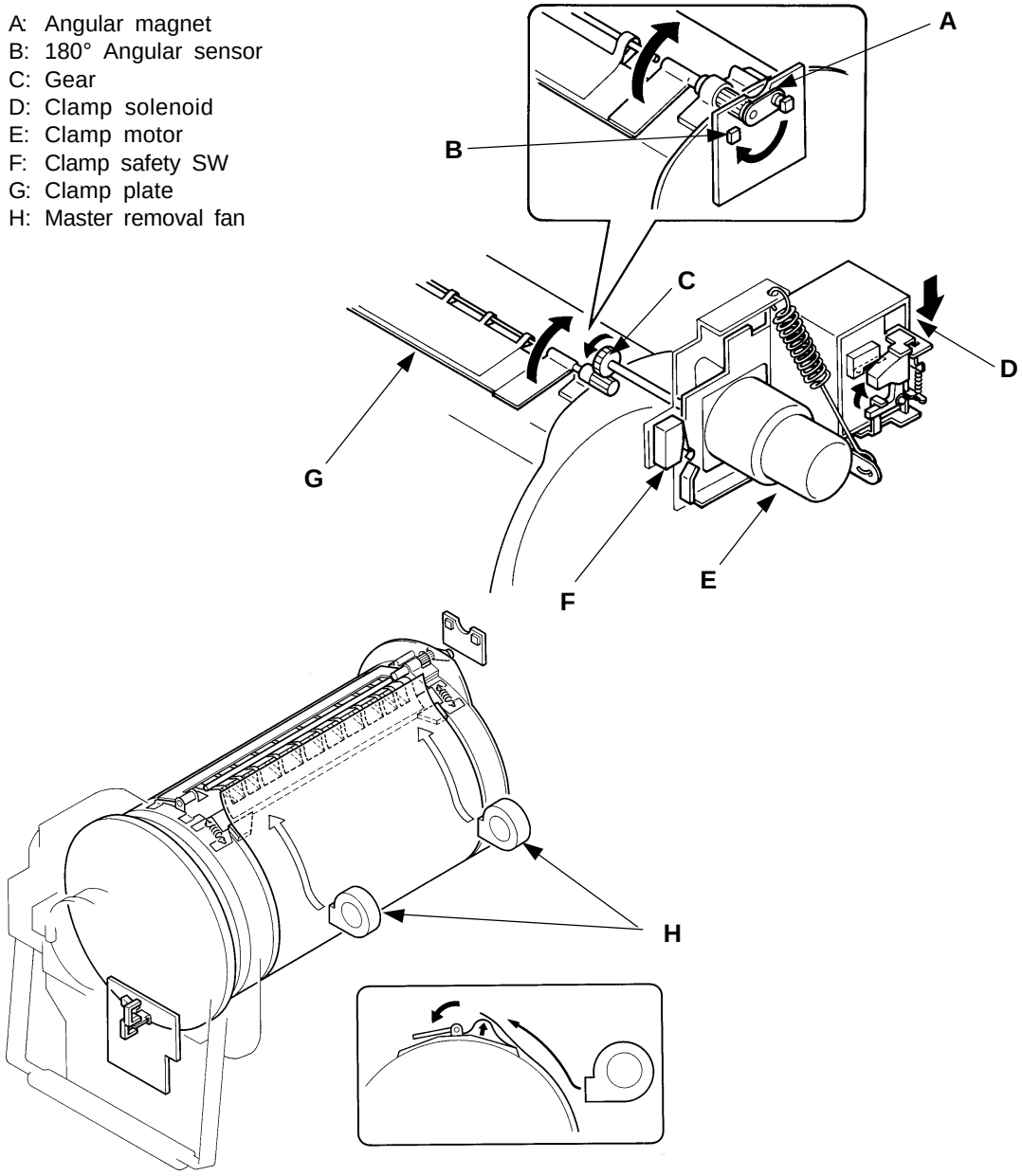


LED DRM1 180 ° Angular sensor
– Light up when magnetism is detected

2. Clamp Plate Opening System

When the START button is pressed for master making, if the Position A sensor detects the position A plate, at the same time, the Clamp solenoid is activated and the Clamp unit is pulled down, releasing the actuator of the Clamp safety switch.
The Clamp motor starts rotating and opens the Clamp plate until the 180° Angular sensor detects the Angular magnet.
The Clamp plate sheet will raise the leading edged of the master to guide the master to the Master removal unit.
This Clamp plate sheet and Master removal fan are combined to control the leading edged of removed master.

A: Angular magnet
B: 180° Angular sensor
C: Gear
D: Clamp solenoid
E: Clamp motor
F: Clamp safety SW
G: Clamp plate
H: Master removal fan



MEMO

LED MJAM Master removal sensor
– Light up when light path is blocked
TUME Master removal hook sensor
– Light up when light path is opened

3. Master Removal System

- Start of Master Removal

When the Clamp safety switch is actuated ON by the Clamp unit, the Master removal vertical transport motor and Master removal solenoid are energized.

By the rotation of the M.-Rmv. vertical transport motor, the Vertical transport roller (down) is rotated via pulleys and belt. The rotation of the vertical transport roller (down) is transmitted to the Vertical transport roller (up) by gears, rotating both rollers together.

At the same time, the Master removal hooks are projected by the turn of the Master removal hook shaft activated by the energized Master removal solenoid.

100 msec later, the Main motor starts, rotating the Drum to remove a used master.

The lead edge of the released used master is caught by the Master removal hooks and advances into between the Vertical transport rollers (up) and (down).

- Finish of Master Removal

When the Drum reaches the Position A, the Main motor is turned off to stop the Drum.

2 seconds later, the M.-Rmv. vertical transport motor and Master removal solenoid are deenergized, to finish the master removal operation.

- Assistance in Master Removal Operation

The Master removal fan operates and floats the top part of a released used master over the Drum, preventing the Master removal hooks from missing the master.

The fan is activated when the Drum comes to the Position A and deactivated at Position C-1 during the master removal.

Besides, the Master guide plate prevents the released master from curling up and clearing the hooks as well.

- Check of Passage of Removed Master

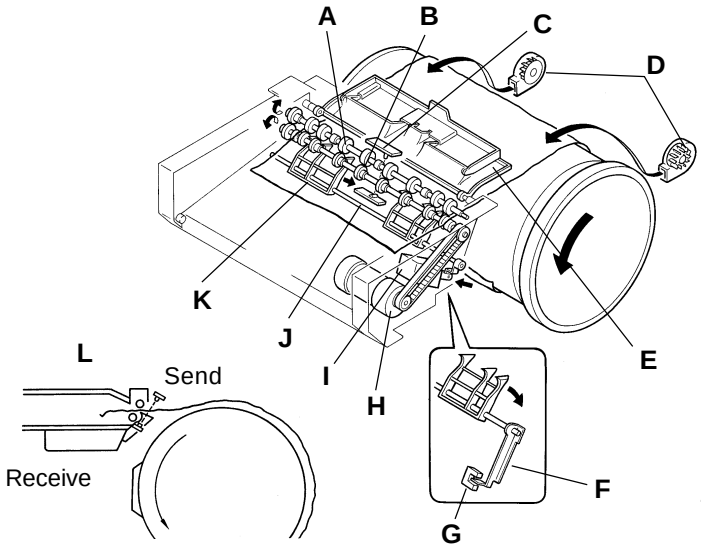
If master is detected on the Drum by the Master loading sensor, the Master removal sensor checks if the light path is blocked by the removed master while the Drum is rotated from the Position **C-1** up to **the Position A**, and if it is opened again **within 2 seconds** after the Drum returns to the Position A (the home position).

- Detection of Master Removal Jam

The Master removal hook sensor checks whether the hooks are correctly returned to their home position when the Master removal solenoid is not activated.

If the light path of the Master removal hook sensor is not blocked while the machine is in idle, it is assumed that the removed master is jammed on the Master removal hooks and the error message "**REMOVE JAMMED MASTER IN DISPOSAL UNIT**" is displayed.

The same error message is diplayed if the light path of the Master removal sensor is blocked, assuming that the removed master is jammed.



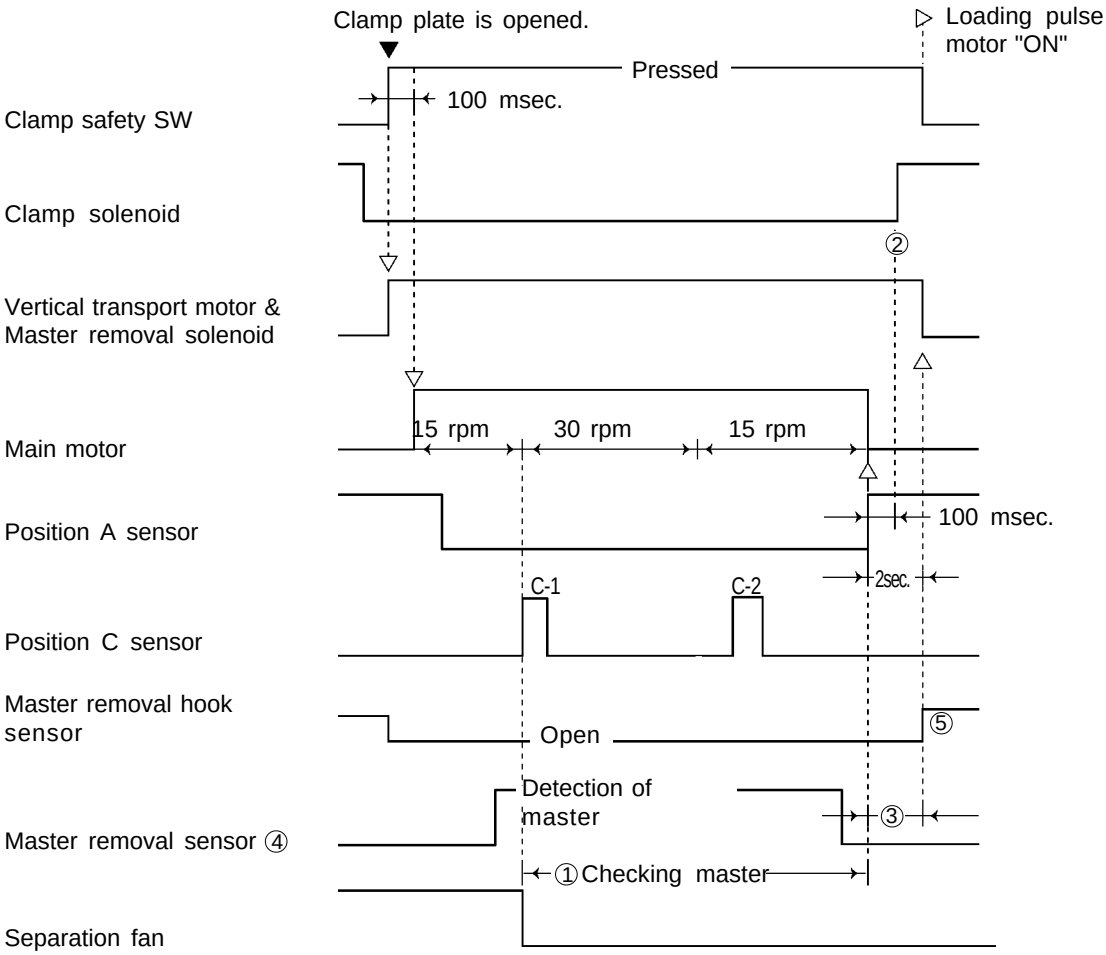
A: Vertical transport roller (up)
B: Vertical transport roller (down)
C: Master removal sensor
D: Master removal fan
E: Master guide plate
F: Hook sensor actuator
G: Master removal hook sensor
H: Master removal vertical transport motor
I: Master removal solenoid
J: Master removal hook shaft
K: Master removal hook
L: Master disposal box

THEORY OF OPERATION

Test Mode No.14 Master removal hook sensor
– Short interval beeps when light path is blocked
No.28 Master removal sensor
– Short interval beeps when light path is blocked
No.70 Master removal fan
No.71 Master removal solenoid, Master removal vertical transport motor

- Timing Chart -

Master Removal System



① If the light path of the sensor has not been blocked since the **Position C-1** by the **Position A**, the machine assumes a Master removal error has occurred and displays “DISPOSAL ERROR REMOVE DRUM AND DISCARD MASTER”.

② If the Master removal sensor still detects a removed master when the Drum stops at the position A, the Clamp solenoid will not be energized until the light path of the sensor is opened.
(The waiting time is **2 seconds** at maximum.)

③ If the Master removal sensor has not been opened **within 2 seconds** after the Drum returns to the postion A, the machine assumes a removed master blocks up the entrance into the Master disposal box and displays “DISPOSAL ERROR REMOVE DRUM AND DISCARD MASTER”.

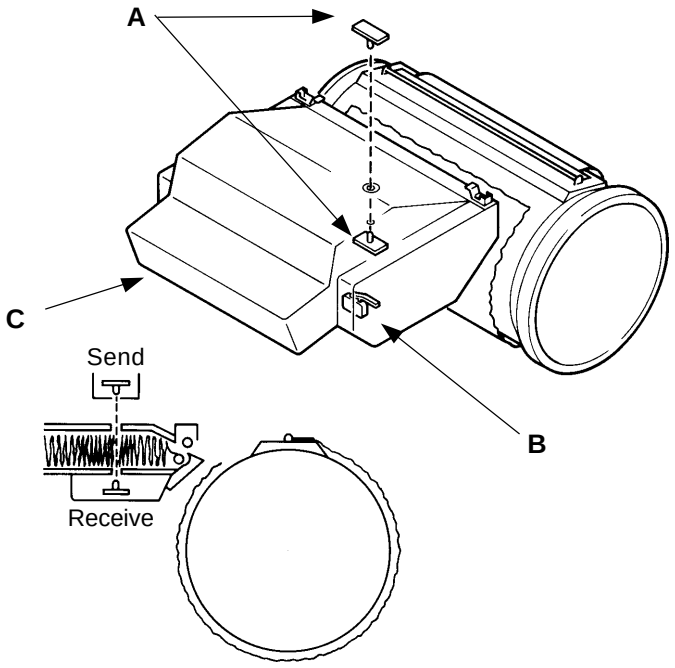
④ If the light path of the Master removal sensor is blocked in any time except master removal operation, the machine assumes that a removed master blocks up the entrance into the Master disposal box and displays “REMOVE JAMMED MASTER IN DISPOSAL UNIT”.

⑤ If the light path of the Master removal hook sensor is not blocked at machine standby time, “REMOVE JAMMED MASTER IN DISPOSAL UNIT” will be displayed.

LED HMAS Disposal box master sensor
– Light up when light path is opened
Test Mode No.33 Disposal box set SW
– Short interval beeps when pressed
No.54 Disposal box master sensor
– Short interval beeps when light path is blocked

4. Disposed Master Check System

The Master removal sensor counts the number of masters that go into the Master disposal box. The master disposal count is increased by one each time the light path of the sensor is blocked and the message indicatoin "**EMPTY DISPOSAL BOX**" is displayed when the count accumulated in the RAM memory on the System PCB reaches the set amount.
The Disposal box master sensor checks the presence of disposed masters inside the Master disposal box. The master disposal count is only reset to "0" if the Disposal box master sensor confirms no master remains in the box after the Master disposal box is pulled out to discard used masters.



A: Disposal box master sensor
B: Disposal box set SW
C: Master disposal box

- If the Disposal box set switch is not pressed, “SET MASTER DISPOSAL BOX IN PLACE” will be displayed.
- If master removal operation is repeated the set times after setting the Master disposal box, “EMPTY DISPOSAL BOX” will be displayed.

Maximum master removal count:
A3/ledger drum — 30 times A4 W drum — 42 times B4/A4/legal drum — 50 times

Test Mode(Memory Switch) No. 224 Master Removal Full Capacity Setting

Memory Switch	0	1	2	3
Full capacity (B4/A4/legal)	50	40	30	20
Full capacity (A3/ledger)	30	20	10	30
Full capacity (A4 W)	42	28	14	42

REMOVAL & ASSEMBLY

1. Master Removal Unit

< Removal Procedure >

1. Turn OFF the power and open the Scanner table.
2. Loosen the screw on the Damper shaft lock plate and slide the plate and release the shaft.
3. Lift the scanner table further to lock it.
4. Remove the mounting screws on the Damper bottom bracket lock plates and remove the brackets.
5. Hook the Dampers on the frame at the bottom of the Scanner table.
6. Remove the Master removal unit, referring to the next page.

- Precautions in Assembly -

- Make sure to secure the Damper bottom bracket lock plates firmly on the brackets.

A: Damper shaft lock plate
B: Damper
C: Damper bottom bracket lock
D: Pan-head Screw SW.W M3x5

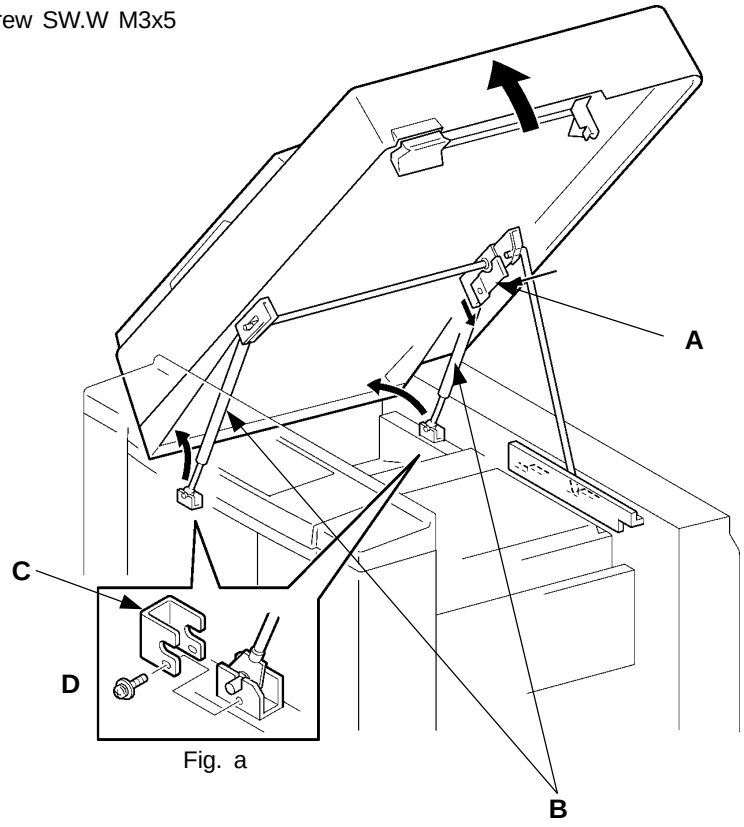


Fig. a

REMOVAL & ASSEMBLY

Test mode No.14 Master removal hook sensor
– Short interval beeps when light path is blocked
No.28 Master removal sensor
– Short interval beeps when light path is blocked
No.33 Disposal box set SW
– Short interval beeps when pressed
No.54 Disposal box master sensor
– Short interval beeps when light path is blocked
No.71 Master removal solenoid, Master removal vertical transport motor

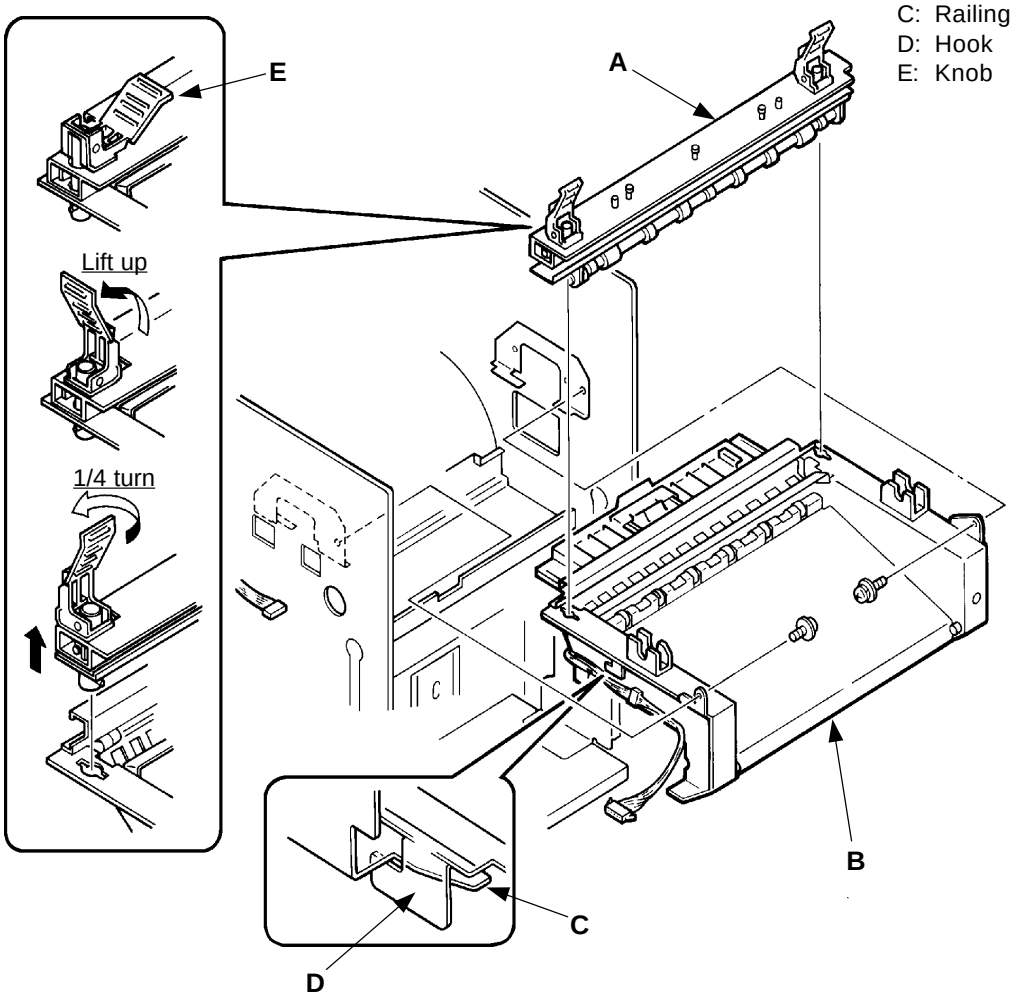
< Removal Procedure >

7. Pull out the Master disposal box from the machine and remove the Paper feed cover.
8. Remove the Back cover and disconnect the wire harness connector of the Master removal unit.
9. Remove two mounting screws on the Master removal unit.
   [Note]
   If required, lift and make a quarter turn on the two Knobs on the Vertical transport roller holder ass'y to free the ass'y from the Master removal unit.
10. Pull the unit towards the paper feed side to unlock the hooks at the bottom of the unit.
    Tip the unit toward you and take it out towards the paper feed side.

- Precautions in Assembly -

- Mount the Master removal unit so that the Master removal guide will be placed on the cutter unit.
- Make sure to lock the hooks at the bottom of the unit on the railings of the side frames.

A: Vertical transport roller holder ass'y
B: Master removal unit
C: Railing
D: Hook
E: Knob



Confirm a firm fit in assembly.

2. Master Removal Solenoid, Master Removal Hook & Vertical Transport Roller (Down)

< Removal Procedure >

Master Removal Solenoid

1) Turn off the power and remove the Master removal unit(see the previous page).
2) Remove the mounting screw of the Master removal solenoid, disconnect the solenoid's connector, and remove the assembly.

- Precautions in Assembly -

- Attach the Master removal solenoid in the center of the long hole of the unit frame.
- Check a projection amount of the Master removal hook after assembly.

Master Removal Hook

3) Remove the Spring B.
4) Remove the mounting screw of the Hook sensor actuator and remove it.
5) Remove the E-rings on the both sides of the Master removal hook shaft, and remove the shaft with the Master removal hooks attached.

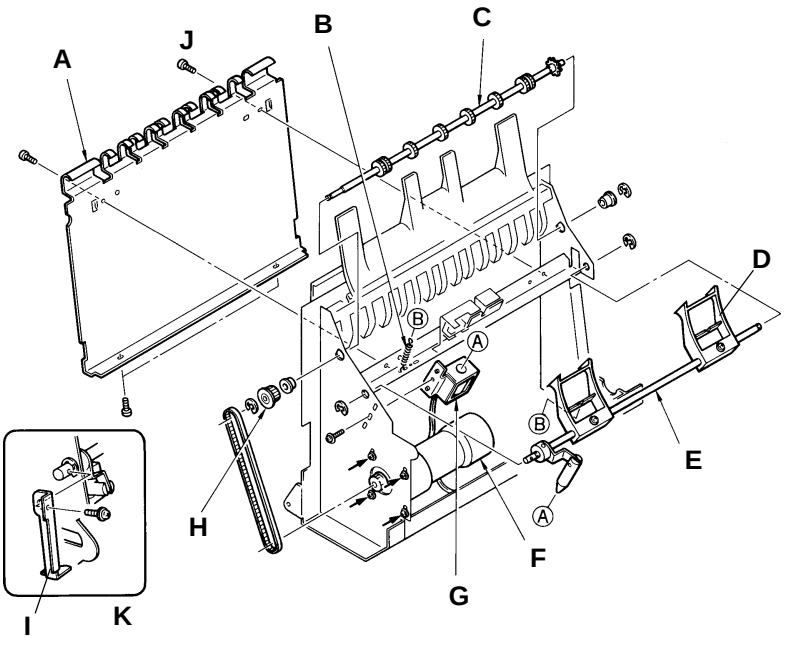
Vertical Transport Roller (Down)

4) Loosen four mounting screws of the M.-Rmv. vertical transport motor and remove the belt from the M.-Rmv. pulley B.
5) Remove E rings at both ends of the Vertical transport roller(down), and remove the M.-Rmv. pulley B and metal bearings.
6) Remove four mounting screws on the M.-Rmv. base plate and unhook the plate from the shaft of the Vertical transport roller (down).
7) Holding down the plunger of the Master removal hooks to set the hooks off the Vertical transport roller (down), move the roller sideways to remove it.

- Precautions in the Assembly -

- Comfirm that the M.-Rmv. pulley B is attached to the shaft in the right direction (the collared side should face outward) because an one-way clutch is built in the pulley.
- Make sure to match the positioning holes on the top face of the M.-Rmv. base plate with the bosses on the Master removal unit frame when securing the plate.
- Make sure to apply good tension to the belt when securing the M.-Rmv. vertical transport motor.

A: Master removal base plate
B: Spring B
C: Vertical transport roller (Down)
D: Master removal hook
E: Master removal hook shaft
F: Master removal vertical transport motor
G: Master removal solenoid
H: Master removal pulley B
I: Hook sensor actuator
J: Bind-head Screw M3x6
K: Pan-head IT Screw



Test Mode No.14 Master removal hook sensor
– Short interval beeps when light path is blocked
No.28 Master removal sensor
– Short interval beeps when light path is blocked
No.48 Master loading sensor
– Short interval beeps when reflected light detected
No.54 Disposal box master sensor
– Short interval beeps when light path is blocked

3. Master Removal Sensor, Master Loading Sensor, Master Removal Hook Sensor & Disposal Box Master Sensor

< Removal Procedure >

Master Removal Sensor

1. Remove the Master removal unit.
2. Remove two mounting screws on the M.-Rmv. upper stay and set aside the upper stay.
3. Remove the mounting screw on the Master removal sensor (send), cut the wire clamper securing the wire of the sensor to the M.-Rmv. upper stay and remove the sensor from the upper stay.
4. Remove two mounting screws on the M.-Rmv. sensor bracket and set aside the bracket.
5. Remove the mounting screw on the Master removal sensor (receive), and remove the sensor from the bracket.
6. Disconnect the connector of the Master removal sensor and cut the wire clampers securing the wires of the sensors to the Master removal unit frame.

- Precaution in Assembly -

- The Master removal sensor (send) is the one with a VR attached.

Master Loading Sensor

2. Remove the mounting screw of the Master loading sensor and disconnect the connector to remove.

Master Removal Hook Sensor

2. Remove the mounting screw of the Master removal hook sensor and disconnect its connector to remove the sensor assembly.

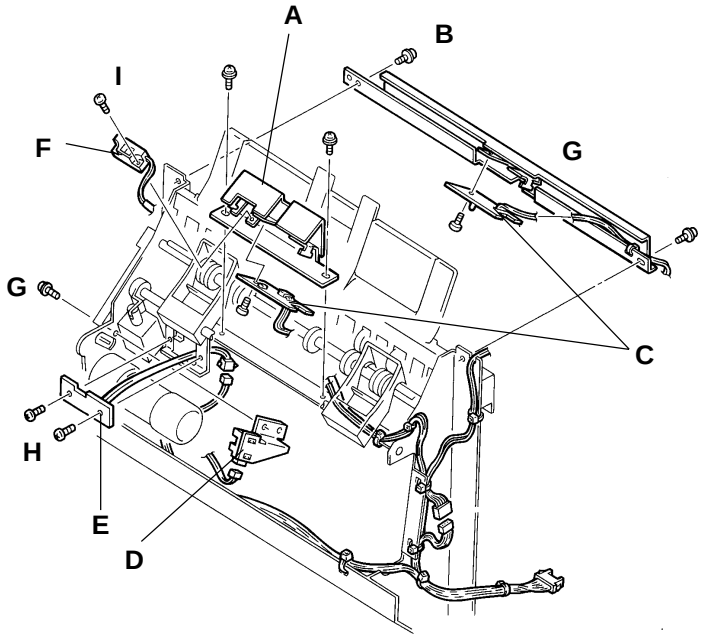
- Precaution for Mounting -

- If the Master removal hook is at the home position(withdrawn), mount to the position where the sensor is surely blocked.

Disposal Box Master Sensor(Rcv.)

2. Remove two mounting screws of the Disposal box master sensor and disconnect its connector to remove the sensor.

A: Master removal sensor bracket
B: Master removal upper stay
C: Master removal sensor
D: Master removal hook sensor
E: Disposal box master sensor
F: Master loading sensor
G: Pan-head IT Screw M3x5
H: Bind-head Screw M3x6
I: Bind-head Screw M3x8



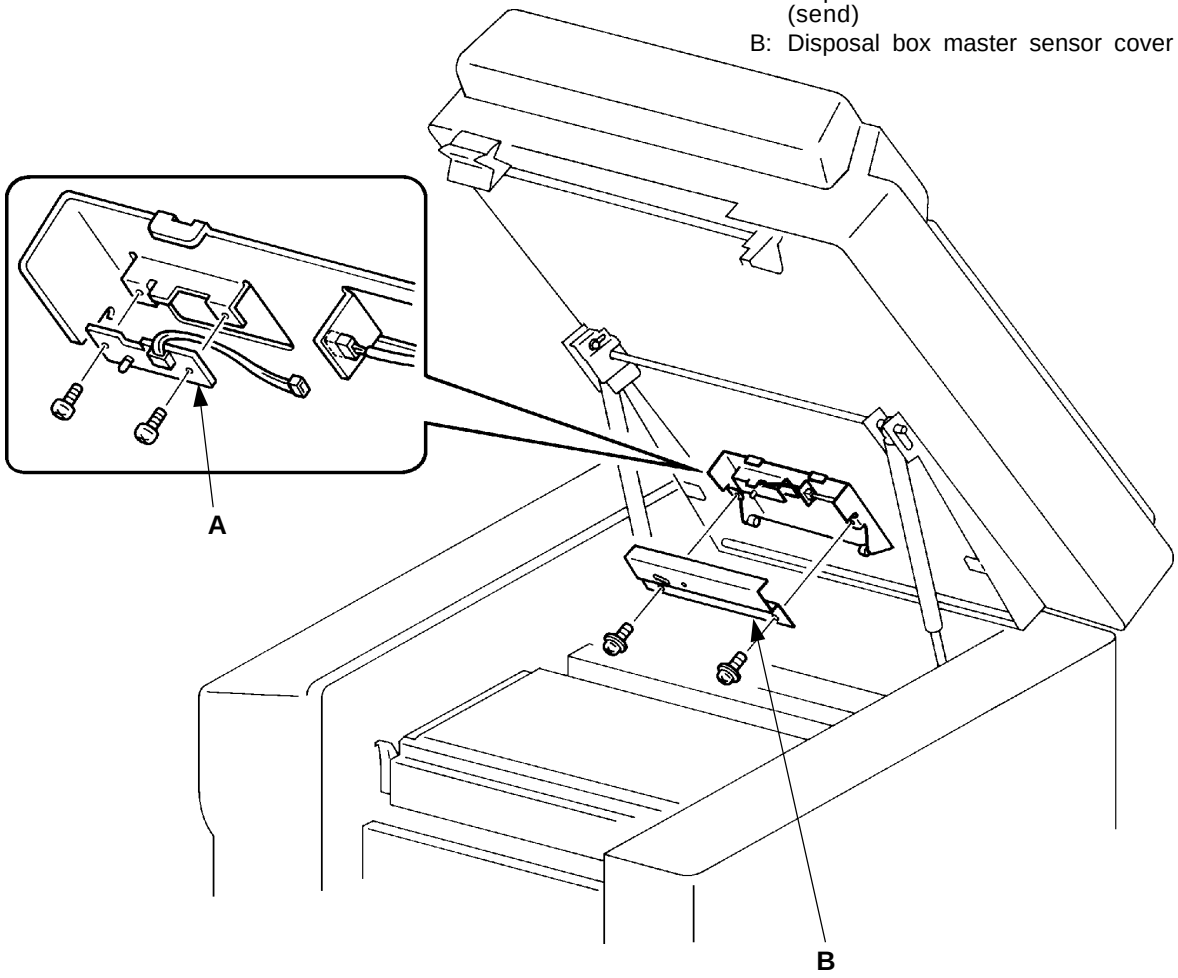
LED HMAS Disposal box master sensor
– Light up when light path is opened
Test Mode No.54 Disposal box master sensor
– Short interval beeps when light path is blocked

4. Disposal Box Master Sensor (Send)

< Removal Procedure >

1. Turn OFF the power, open the Scanner table and remove the Master disposal box.
2. Remove two mounting screws on the Disposal box master sensor cover and remove the cover.
3. Remove two mounting screws on the Disposal box master sensor (send), disconnect the connector and remove the sensor.

A: Disposal box master sensor (send)
B: Disposal box master sensor cover

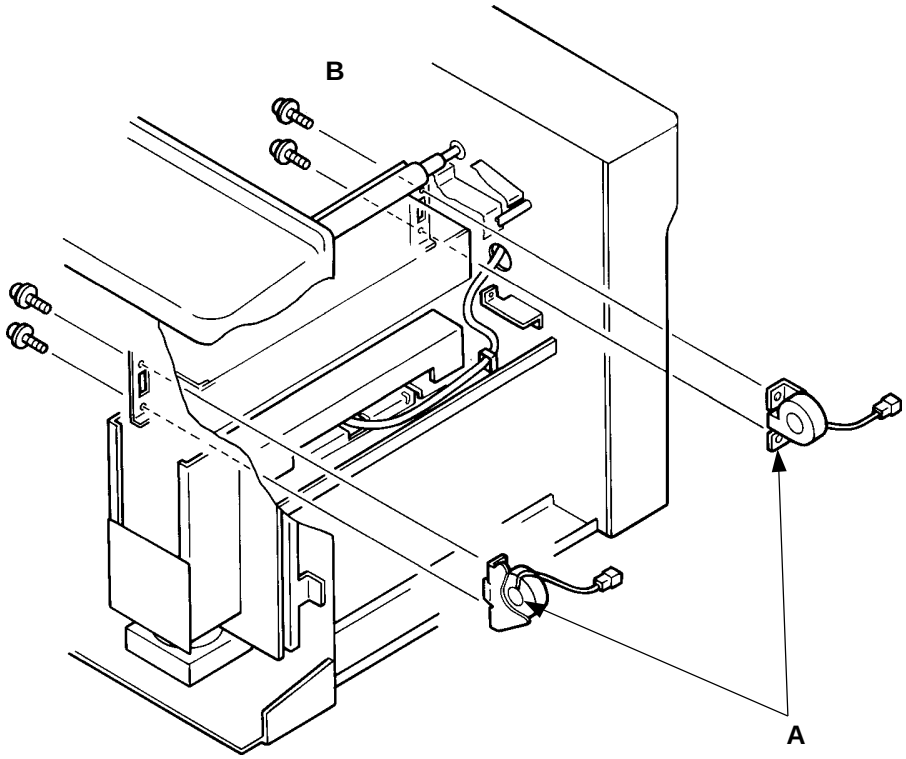


5. Master Removal Fan

< Removal Procedure >

1. Remove the Master roller holder unit.
2. Remove two mounting screws of the Aero guide sheet and remove the sheet.
3. Remove two mounting screws of the Master removal fan, disconnect the connector and remove the fan.

A: Master removal fan
B: Pan-head Screw SW.W M4x8



ADJUSTMENT

1. Projected Position of Master Removal Hooks

1. Pull out the Drum, open the Clamp plate and return the Drum into the machine.
2. Rotate the drum until the edge of the opened Clamp plate is positioned just below the tips of the Master removal hooks.
2. Start up Test mode **No.71** to project the Master removal hooks.
3. Check the tip of the projected Master removal hooks is **2 ~ 3mm** off the Clamp plate on the Drum.
4. If not, return the Drum to the home position.
5. Turn off the power and remove the Master removal unit.
6. Attach the Vertical transport roller holder ass'y and loosen the allen screw of the Linking plate.
7. Pressing the plunger of the Master removal solenoid, turn the Master removal hooks until the tip of the hook is **17~18mm** off the shaft of the Vertical transport roller (up).
   Holding the Master removal hooks in this position, tighten the allen screw on the Linking plate without releasing the plunger of the Master removal solenoid.
8. Re-check the projected position of the Master removal hooks with Test mode No.71.

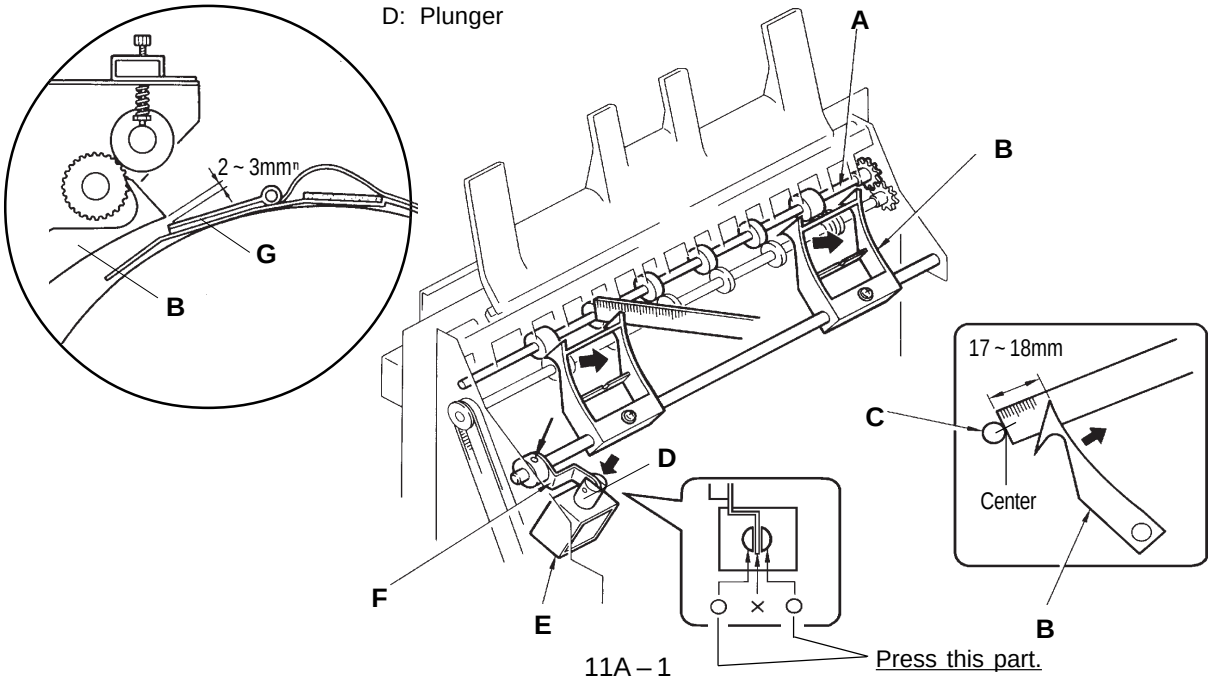
- Precautions in Adjustment -

- When adjusting the projected position of the Master removal hooks, make sure to press the plunger not the Linking plate.

- Results of Misadjustment -

- If the Master removal hooks are not projected enough;
  a used master will not be removed from the drum and the error massage "DISPOSAL ERROR REMOVE DRUM AND DISCARD MASTER" is displayed.
- If the Master removal hooks are projected too much;
  the tip of the hooks will contact the Clamp plate, causing the hooks and/or Clamp plate to be deformed. In the worst case, the Clamp plate will be caught between the Vertical transport rollers, causing the drum to be stuck in rotation, which will result in the error massage "T1" display on panel.

A: Vertical transport roller (up)
B: Master removal hook
C: Shaft of Vertical transport roller (up)
D: Plunger
E: Master removal solenoid
F: Linking plate
G: Clamp plate



ADJUSTMENT

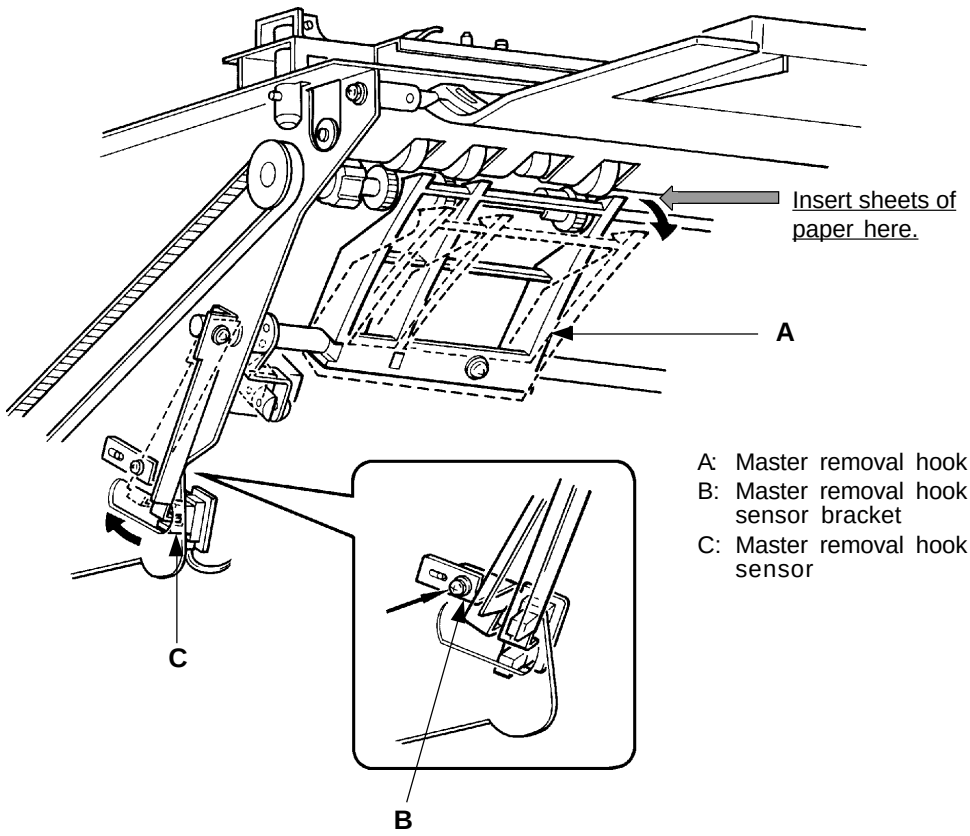
LED TUME Master removal hook sensor
– Light up when light path is opened
Test Mode No.14 Mater removal hook sensor
– Short interval beeps when light path is blocked
No.71 Master removal solenoid

2. Position of Master Removal Hook Sensor

1. Turn ON the power and confirm that the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" is not displayed on the operation panel.
2. Open the Scanner table and force both the Scanner table set sw and the Main motor interlock sw to be actuated.
   Insert several sheets of paper into between the Master removal hooks and the M.-remv. vertical transport roller without blocking the light path of the Master removal sensor.
3. Check if the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" is displayed under this condition.
4. If not, turn OFF the power and remove the Master removal unit.
5. Loosen the mounting screw of the Master removal hook sensor bracket and adjust the position of the Master removal hook sensor by moving the bracket.

- Results of Misadjustment -

- If the Master removal hook sensor is out of position;
  the error message "REMOVE JAMMED MASTER IN DISPOSAL UNIT" will be displayed without any masters jammed at the entrance of the Master removal unit.



- When the Master removal hook is located at the home position, the light path of the Master removal hook sensor is shut off by the Hook sensor actuator.